

Utah Department of Environmental Quality Division of Solid and Hazardous Waste Fact Sheet



January 2003

PERCHLORATE

This fact sheet describes the Department of Environmental Quality's (DEQ) interest and concern regarding perchlorate in the State of Utah.

WHAT IS PERCHLORATE?

Perchlorate is a compound consisting of one chlorine atom surrounded by oxygen atoms. It can occur naturally but is primarily produced for industrial uses. Perchlorate is commonly combined with ammonium, potassium or metals to form a solid salt.

Ammonium perchlorate is the most common perchlorate salt in Utah. Ammonium perchlorate is used as an ingredient in solid rocket propellants.

Perchlorate, an unregulated compound, is increasingly being found in the environment. Its occurrence in the environment can be attributed to past waste handling practices at facilities that manufacture or use this material.

WHY IS PERCHLORATE A CONCERN?

- ♦ Perchlorate has potential adverse human health effects.

- ♦ Perchlorate may have an adverse effect on ecosystems.
- ♦ Perchlorate salts readily dissolve in water and can persist for many decades under typical groundwater and surface water conditions.
- ♦ Perchlorate is difficult to remove from ground and surface waters using standard water treatment processes.

HOW DOES PERCHLORATE AFFECT HUMAN HEALTH?

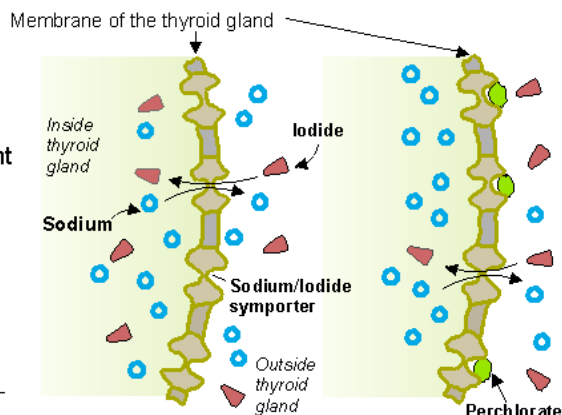
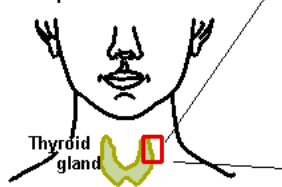
Perchlorate is what scientists refer to as an endocrine disrupter, because it can alter hormone levels. Perchlorate

blocks iodine and inhibits iodine uptake in the thyroid gland. Iodine is an essential component of the thyroid hormones. Perchlorate disrupts the thyroid's function. The figure below shows how perchlorate interferes with the production of thyroid hormones.

In adults, the thyroid helps to regulate metabolism. In children, the thyroid plays an important role in proper development and in regulating metabolism. An impairment of thyroid function may impact the fetus or newborn, resulting in changes in behavior, delayed

Blocking Agent

In the human body, perchlorate inhibits production of thyroid hormones, essential to normal organ development in babies, especially brain development.



1 Iodide from foods, such as salt, enters the body.

2 Iodide is transported into the thyroid by the sodium/iodide symporter (NIS) as sodium is transported out. The iodide is then used to produce thyroid hormones.

3 If perchlorate is ingested, it blocks the symporter, disrupting the uptake of iodide.

Modified from: Environmental Protection Agency, Environmental Working Group

development and decreased learning capability.

Exposure to perchlorate may also result in thyroid gland tumors. In the EPA's draft analysis of perchlorate toxicity, the EPA determined that perchlorate's disruption of the iodide uptake in the thyroid gland is the key event that can lead to changes in development and/or tumor formation.

WHERE IS PERCHLORATE FOUND IN UTAH?

Utah has an active aerospace industry and a number of large military installations. In addition, the America Pacific Corporation in Cedar City, Utah, is the only manufacturer of ammonium perchlorate in the United States.

Since 1997, DEQ has identified four sites with perchlorate contamination in the groundwater. The known perchlorate contamination exists at the following facilities:

- ♦ ATK Thiokol Propulsion, Bacchus Works, West Valley City, Utah
- ♦ ATK Thiokol Propulsion, Promontory Facility, Promontory, Utah
- ♦ Hill Air Force Base, Clearfield, Utah

DEQ continues to work with these facilities to assess the magnitude and extent of the contamination, and manage exposure pathways.

WHAT IS BEING DONE ABOUT PERCHLORATE?

While perchlorate is currently not regulated under the National Drinking Water Regulations, it is on the Contaminant Candidate List for the Safe Drinking Water Act. However, before a regulatory level can be established, EPA needs to address the data gaps regarding occurrence, health effects, treatment technologies and analytical methods.

In an effort to address these data gaps in the most expeditious method, the EPA organized the Interagency Perchlorate Steering Committee (IPSC) in January 1998. DEQ and the State Health Laboratory have been active members of the IPSC since its inception.

The IPSC was formed to address the perchlorate data gaps and inform and involve stakeholders about development in the technical and regulatory arenas. In March 2002, the IPSC conducted a peer review conference on the second phase of toxicological studies. After the EPA reviews the peer review comments, they will publish the results. The result will include a reference dose (RfD) for perchlorate and an assessment of the carcinogenic potential of this compound.

A reference dose (RfD) is an estimate of a daily oral exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. It is also known as a virtually safe dose.

WHERE CAN I GET MORE INFORMATION ABOUT PERCHLORATE?

For additional information on the toxicological effects of perchlorate, DEQ suggests the following website:

<http://cfpub.epa.gov/ncea/cfm/nceahome.cfm>

For more general information about perchlorate, visit:

<http://www.perchloratenews.com/index.html>

For information regarding perchlorate treatment technologies, DEQ suggest the Clu-In website at:

<http://www.clu-in.org/>

For information regarding drinking water quality, contact Rachael Cassady, Utah Division of Drinking Water, at 801-536-4200, or your local drinking water supplier.

Additional Information

For additional information regarding perchlorate issues in Utah, please contact:

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